

U.S. Patent Application Serial No. 10/527,090
Response filed May 5, 2006
Reply to OA dated February 8, 2006

AMENDMENTS TO THE CLAIMS:

Please amend claims 1-24 and add new claims 25-36, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): A transformant of *Streptomyces mobaraensis*, comprising a structural gene of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis* and a promoter and a terminator acting on the structural gene, which are externally introduced.

Claim 2 (Currently amended): The transformant of *Streptomyces mobaraensis* according to claim 1, wherein the promoter is a promoter of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*.

Claim 3 (Currently amended): The transformant of *Streptomyces mobaraensis* according to claim 1, wherein the terminator is a terminator of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*.

Claim 4 (Currently amended): ~~The A~~ transformant of *Streptomyces mobaraensis* according to claim 1 comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced,

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wherein the structural gene comprises a the sequence set forth in SEQ ID NO: 1 or a sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.

Claim 5 (Currently amended): A transformant of *Streptomyces mobaraensis* comprising a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2 or sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.

Claim 6 (Currently amended): The transformant of *Streptomyces mobaraensis* according to claim 1, which is a transformant of *Streptomyces mobaraensis* S-8112 or a mutant strain thereof.

Claim 7 (Currently amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces mobaraensis* comprising a structural gene of transglutaminase derived isolated from *Streptomyces mobaraensis* and a promoter and a terminator acting on the structural gene, which are externally introduced, under the conditions where the structural gene can be expressed; and
collecting the produced transglutaminase.

Claim 8 (Currently amended): The process for producing transglutaminase according to claim 7, wherein the promoter is a promoter of transglutaminase derived isolated from *Streptomyces*

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mobaraensis.

Claim 9 (Currently amended): The process for producing transglutaminase according to claim 7, wherein the terminator is a terminator of transglutaminase ~~derived~~ isolated from *Streptomyces mobaraensis*.

Claim 10 (Currently amended): The process for producing the transglutaminase according to claim 7, wherein the structural gene comprises a the sequence set forth in SEQ ID NO: 1 ~~or a sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.~~

Claim 11 (Currently amended): The process for producing transglutaminase according to claim 7, wherein the transformant of *Streptomyces mobaraensis* comprises a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2 ~~or sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.~~

Claim 12 (Currently amended): The process for producing transglutaminase according to claim 7, wherein the transformant of *Streptomyces mobaraensis* is a transformant of *Streptomyces mobaraensis* S-8112 ~~or a mutant strain thereof.~~

Claim 13 (Currently amended): A transformant of *Streptomyces lividans* comprising a

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structural gene of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*, and a promoter and a terminator acting on the structural gene, which are externally introduced.

Claim 14 (Currently amended): The transformant of *Streptomyces lividans* according to claim 13, wherein the promoter is a promoter of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*.

Claim 15 (Currently amended): The transformant of *Streptomyces lividans* according to claim 13, wherein the terminator is a terminator of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*.

Claim 16 (Currently amended): The transformant of *Streptomyces lividans* according to ~~claim 13 comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced~~, wherein the structural gene comprises a sequence set forth in SEQ ID NO: 1 or a sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.

Claim 17 (Currently amended): A transformant of *Streptomyces lividans* comprising a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2 or sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.

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Claim 18 (Currently amended): The transformant of *Streptomyces lividans* according to claim 13, which is a transformant of *Streptomyces lividans* 3131 ~~or a mutant strain thereof~~.

Claim 19 (Currently amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces lividans* comprising a structural gene of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*, and a promoter and a terminator acting on the structural gene, which are externally introduced, under the conditions where the structural gene can be expressed; and
collecting the produced transglutaminase.

Claim 20 (Currently amended): The process for producing transglutaminase according to claim 19, wherein the promoter is a promoter of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*.

Claim 21 (Currently amended): The process for producing transglutaminase according to claim 19, wherein the terminator is a terminator of transglutaminase ~~derived isolated~~ from *Streptomyces mobaraensis*.

Claim 22 (Currently amended): The process for producing transglutaminase according to

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claim 19, wherein the structural gene comprises a sequence set forth in SEQ ID NO: 1 ~~or a sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.~~

Claim 23 (Currently amended): The process for producing transglutaminase according to claim 19, wherein the transformant of *Streptomyces lividans* comprises a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2 ~~or sequence obtained by modifying a part of the sequence, the sequence encoding transglutaminase.~~

Claim 24 (Currently amended): The process for producing transglutaminase according to claim 19, wherein the transformant of *Streptomyces lividans* is a transformant of *Streptomyces lividans* 3131 ~~or a mutant strain thereof.~~

Claim 25 (New): A transformant of *Streptomyces mobaraensis* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced,

wherein the structural gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formaldehyde, 10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 °C, followed by washing with 0.1xSSC and 0.1%SDS at 68 °C, and the modified sequence encodes a protein having

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transglutaminase activity.

Claim 26 (New): A transformant of *Streptomyces mobaraensis* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced,

wherein the structural gene of transglutaminase and the promoter and the terminator acting on the structural gene comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formaldehyde, 10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 °C, followed by washing with 0.1xSSC and 0.1%SDS at 68 °C, and the modified sequence encodes a protein having transglutaminase activity.

Claim 27 (New): The transformant of *Streptomyces mobaraensis* according to claim 1, which is a transformant of a strain obtained by mutating *Streptomyces mobaraensis* S-8112.

Claim 28 (New): A process for producing transglutaminase, comprising the steps of: culturing a transformant of *Streptomyces mobaraensis* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced, under the conditions where the structural gene can be expressed; and

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collecting the produced transglutaminase;

wherein the structural gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formaldehyde, 10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 μ g/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 $^{\circ}$ C, followed by washing with 0.1xSSC and 0.1%SDS at 68 $^{\circ}$ C, and the modified sequence encodes a protein having transglutaminase activity.

Claim 29 (New): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces mobaraensis* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced, under the conditions where the structural gene can be expressed; and

collecting the produced transglutaminase;

wherein the structural gene of transglutaminase and the promoter and the terminator acting on the structural gene comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formaldehyde, 10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 μ g/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 $^{\circ}$ C, followed by washing with 0.1xSSC and 0.1%SDS at 68 $^{\circ}$ C, and the modified sequence encodes a protein having transglutaminase activity.

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Claim 30 (New): The process for producing transglutaminase according to claim 7, wherein the transformant of *Streptomyces mobaraensis* is a transformant of a strain obtained by mutating *Streptomyces mobaraensis* S-8112.

Claim 31(New): A transformant of *Streptomyces lividans* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced,

wherein the structural gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formaldehyde, 10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 °C, followed by washing with 0.1xSSC and 0.1%SDS at 68 °C, and the modified sequence encodes a protein having transglutaminase activity.

Claim 32 (New): A transformant of *Streptomyces lividans* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced,

wherein the structural gene of transglutaminase and the promoter and the terminator acting on the structural gene comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formaldehyde,

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10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 μ g/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 °C, followed by washing with 0.1xSSC and 0.1%SDS at 68 °C, and the modified sequence encodes a protein having transglutaminase activity.

Claim 33 (New): The transformant of *Streptomyces lividans* according to claim 13, which is a transformant of a strain obtained by mutating *Streptomyces lividans* 3131.

Claim 34 (New): A process for producing transglutaminase, comprising the steps of:
culturing a transformant of *Streptomyces lividans* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced, under the conditions where the structural gene can be expressed; and
collecting the produced transglutaminase;
wherein the structural gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formaldehyde, 10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 μ g/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 °C, followed by washing with 0.1xSSC and 0.1%SDS at 68 °C, and the modified sequence encodes a protein having transglutaminase activity.

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Claim 35 (New): A process for producing transglutaminase, comprising the steps of:
culturing a transformant of *Streptomyces lividans* comprising a structural gene of transglutaminase and a promoter and a terminator acting on the structural gene, which are externally introduced, under the conditions where the structural gene can be expressed; and
collecting the produced transglutaminase;
wherein the structural gene of transglutaminase and the promoter and the terminator acting on the structural gene comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formaldehyde, 10xSSC, 5X Denhardt solution, 1%SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42 °C, followed by washing with 0.1xSSC and 0.1%SDS at 68 °C, and the modified sequence encodes a protein having transglutaminase activity.

Claim 36 (New): The process for producing transglutaminase according to claim 19, wherein the transformant of *Streptomyces lividans* is a transformant of a strain obtained by mutating *Streptomyces lividans* 3131.